



EPA Region 7 TMDL Review

TMDL ID: IA 03-SSK-00360-L **Waterbody ID:** IA 03-SSK-00360-L
Waterbody Name: Little Wall Lake
Tributary: Little Wall Lake
Pollutant: Algae, Turbidity
State: IA **HUC:** 0708010504
BASIN: Skunk River
Submittal Date: December 15, 2005
Approved: Yes

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

The TMDL for Little Wall Lake was formally submitted by the Iowa Department of Natural Resources (IDNR) in a letter received by EPA on December 19, 2005.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The loading capacity is set through the use of a lake response model to target the annual amount of total phosphorus (TP) that Little Wall lake can receive to meet its designated uses. Lake response modeling is a function of the volume of water pumped into the lake which will coincide with a reduction in suspended solids loads. To address the identified pollutants (algae and turbidity) a Trophic State Index (TSI) value of 65 for total phosphorus has been targeted to limit the growth of algae and improve the effects on water transparency. This TMDL will result in a 38% reduction in total phosphorus loading and should result in attainment of applicable water quality standards.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Designated uses of Little Wall Lake are primary contact recreational use (Class A1) and aquatic life (Class B(LW)). In 1999, Little Wall Lake was included on the impaired waters list due to noxious aquatic plants. In 2002, this impairment was changed to algae and turbidity, which are more descriptive of the problems identified at Little Wall Lake. More recent assessments in 2004 revealed that the Class A1 designated use were assessed as "partially supporting" due to the presence of aesthetically objectionable blooms of algae and of nuisance algal species (e.g., bluegreen algae).

For algae and turbidity the impairment is based on narrative standards which state that Little Wall Lake should be “free from materials attributable to wastewater discharges or agricultural practices producing objectionable color, odor, or other aesthetically objectionable conditions.” The presence of objectionable algal blooms, limited clarity, and the presence of nuisance algal species are linked to total phosphorus loading through the use of Carlson’s Trophic State Index (TSI). The TSI uses a relationship between Secchi transparency (SD), algal biomass as chlorophyll a (CHLA), and total phosphorus (TP) derived from a set of reference temperate lakes. The target is a $TSI(TP) < 65$, which should result in $TSI(SD)$ and $TSI(CHLA) < 65$.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The linkage for algae and turbidity is defined through Carlson’s TSI. This linkage is indicated by a relationship between TP, chlorophyll, and water transparency seen in a group of reference lakes. Nutrient ratios suggest some phosphorus limitation. Additionally, phosphorus is targeted because of blue-green algae’s ability to fix atmospheric nitrogen and the overabundance of phosphorus inputs. The Vollenweider 1982 Shallow Lake Model was selected to relate total phosphorus TMDL loads to growing season in-lake concentrations. Reductions in total phosphorus are expected to result in similar reductions in suspended solids. The load allocations and margin of safety do not exceed the load capacity.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Sources for total phosphorus are influenced only by nonpoint. There are no point source discharges in the watershed. Nonpoint sources include water pumped from drainage areas outside the watershed, watershed areas that drain directly into the lake, groundwater, and direct precipitation on the lake surface. The largest estimated nonpoint source is from water pumped from outside the watershed, which make up about 70% of the total estimated loads from nonpoint sources. Incidental sources identified include manure and wastes from wildlife, pets and fish cleaning stations. These incidental sources will be evaluated in phase 2 if they are found to be significant. It appears all sources of total phosphorus have been considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The load allocation for this TMDL is a function of the volume of water pumped into the lake.

There are no significant phosphorus point source contributors in the Little Wall Lake watershed. The WLA is zero pounds per year.

WLA Comment

There are no point sources for phosphorus, the WLA is set to zero.

LA Comment

The load allocation for total phosphorus is determined by the pumped flow and the allowable load (pounds per year) into the lake. As an example, for a pumped volume of 690 acre-feet of water pumped to the lake the calculation for the total phosphorus load capacity is 560 pounds. The TMDL contains an equation to calculate LA at differing levels of pumped flow with a 10% margin of safety.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The MOS for total phosphorus is explicit in that the loads were calculated based on in-lake concentrations 10% below the desired endpoint.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

The TMDL for algae and turbidity was set for an annual loading of phosphorus that will result in meeting growing season targets.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

A meeting was held with the Hamilton County Conservation Board on May 3, 2005. A second public meeting was held on October 26, 2005 at Little Wall Lake, IA. The TMDL was available at the meeting and also on the Iowa DNR web site for public comment for 30 days.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Monitoring for parameters associated with the algal and turbidity impairments will, at a minimum, meet the requirements established by 305(b) guidelines for water body assessment. This will consist of three lake samples per year for three years or five samples a year for two years. The data will be collected by 2010.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

There are no Iowa waste loads included in this TMDL. No allowance for increased pollutant loads was included in this TMDL.